Analyzing The Impact of Public Debt and Capital Expenditure on Gross Domestic Product (GDP): A Case Study of The Jordanian Economy (2008-2024)

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Abstract

This study investigates how domestic and external public debt, together with capital expenditure, have shaped the trajectory of Jordan's gross domestic product (GDP) from 2008 to 2024. Considering Jordan's ongoing exposure to external shocks and deep-seated structural vulnerabilities, the analysis highlights the pivotal role of fiscal policy in steering macroeconomic outcomes and fostering long-term stability, particularly during periods of pronounced economic volatility.

As a relatively small and structurally open economy, Jordan remains highly dependent on imported energy, making it especially susceptible to both domestic and external shocks. Elevated public debt—measured both in absolute terms and as a share of GDP—further amplifies the country's vulnerability to regional geopolitical and economic instability. Nevertheless, the government has pursued a series of policy reforms designed to improve the effectiveness of public debt management and capital expenditure in supporting sustainable growth.

In addition, public debt management and capital expenditure effectiveness are closely linked to government accounting practices and fiscal transparency. Proper classification and monitoring of debt instruments can reduce fiscal risks and support long-term macroeconomic stability.

The econometric analysis, conducted using EViews (2009), provides evidence of cointegration among the variables. This indicates that, over time, short-term fluctuations in public debt and capital investment can contribute to correcting long-term imbalances in real GDP.

Keywords: *Public Debt; Capital Expenditure; Gross Domestic Product (GDP).*

1. Theoretical Review of The Relationship between The Study Variables

Fiscal policy primarily concerns itself with the correction mechanisms required to align domestic expenditure with available economic resources. Achieving this alignment necessitates a coordinated application of public finance instruments to ensure consistency between the level and structure of aggregate demand and the composition of aggregate supply. Public debt includes various instruments such as bonds, treasury bills, loans, Special Drawing Rights (SDR), deposits, insurance schemes, pension liabilities, unified guarantees, and accounts payable. Understanding and classifying these instruments is essential for macroeconomic stability and public accounting, ensuring transparency and supporting fiscal sustainability. Thus, the classification of debt instruments has direct implications not only for macroeconomic stability but also for public sector accounting and financial reporting. Public expenditures are financed through a combination of domestic revenues (mainly taxes) and borrowing, both internal and external, which may be driven by political or economic motivations.

Governments across both developed and developing economies aim to stabilize macroeconomic conditions by employing fiscal policy as a tool to influence aggregate demand and supply. This approach aims to reduce macroeconomic volatility, foster conditions for sustainable growth, lower inflation and unemployment, and support continued economic activity, at least in the short term. Longer-term goals typically require interaction with other policies, especially monetary and structural reforms.

The effectiveness of fiscal policy is bounded by the interdependent dynamics of goods and money markets. This interaction is captured within the IS-LM framework, where fiscal stimuli (expansionary or contractionary) affect national income in stages, rather than instantaneously. Empirical evidence suggests that persistent budget deficits often lead to rising public debt, which, in turn, imposes additional financial burdens on future budgets.

In Jordan, capital expenditure as a share of total government spending remained limited, averaging only around 6% of GDP in the early years of the study (2008–2011), while current expenditures consumed approximately 93% of the budget. This imbalance restricted productive capital investment, weakening the government's ability to sustain debt-financed growth. Since such investments require substantial financial resources, they are often undertaken by the public sector. Securing adequate financing—whether through public debt or alternative sources—is essential for accelerating output growth and expanding national productive capacity.

In both advanced and developing economies, producers strive not only to maintain current production capabilities but also to expand the production possibilities frontier (PPF). Long-term demand growth and profitability incentives drive investments in technological upgrades, human capital development, and innovation, which together enhance capital intensity and push the PPF outward.

The interplay between public debt, GDP growth, and capital formation has become increasingly important for policymakers, as emphasized by recent assessments for Jordan in the World Bank's Jordan Economic Monitor (2023–2024) and the Central Bank of Jordan (2024), alongside international guidance on fiscal transparency and public debt statistics (IMF, 2011), highlighting non-linear debt–growth dynamics and the role of public-sector accounting and governance. Misalignment between these variables—often resulting from conflicting fiscal, monetary, or investment policy goals—can lead to inefficiency and economic instability. Achieving coherence requires a clear delineation of responsibilities across the public and private sectors, emphasizing the need for private-sector participation in generating aggregate demand, boosting supply responsiveness, and ensuring macroeconomic equilibrium both in the short and long run.

2. Evolution of The Key Variables (2008–2024)

2.1. GDP Growth, Unemployment, and Inflation Trends (2008–2020)

Gross Domestic Product (GDP) is a core macroeconomic indicator that reflects the level of economic activity within a country over a specified period, typically one year. It represents the aggregate value added of all goods and services produced within a nation's borders during that period.

Despite political and economic volatility globally and regionally, including rising energy and commodity prices and the aftermath of the 2008 financial crisis, Jordan achieved a real GDP growth of 0.05% in 2008. This growth was largely due to increased national exports and a reduction in the current account deficit, which fell from 0.17 in 2007 to 0.12 in 2008. This growth was largely attributed to increased national exports and a reduction in the current account deficit relative to GDP, which fell from 0.17 in 2007 to 0.12 in 2008. Fiscal deficit relative to GDP also declined, from 0.05 in 2007 to 0.04 in 2008. These developments helped strengthen Jordan's economic performance and reduce the unemployment rate to approximately 12%.

Jordan is a small, open economy characterized by private enterprise under a constitutional monarchy. Services account for two-thirds of GDP, and the economy benefits from substantial remittances from citizens working abroad. As shown in Table 1), GDP rose steadily from JD 16.08 billion in 2008 to JD 20.96 billion in 2011, with real annual growth rates of 0.78%, 6.8%, and 4.2%, respectively, for the latter three years. However, growth decelerated in part due to political and economic pressures in the region, poor macroeconomic management, and deteriorating conditions for conducting complex economic activities. This stagnation was coupled with persistently high unemployment rates.

The Central Bank of Jordan's 2012 Annual Report attributed the weakening of public finances in prior years to the global financial crisis. By 2012, the fiscal deficit relative to GDP had surged to 8.2%, driven by higher current expenditures and structural imbalances in public spending. This was compounded by the fact that public expenditure growth outpaced revenue increases.

Although the government implemented austerity measures such as lifting fuel subsidies and liberalizing energy prices, inflation remained moderate in 2011, providing a relatively stable environment for modest economic recovery in subsequent years.

Table 1: GDP Trends at Current Prices (2008–2024) (in Million Jordanian Dinars)

Year	Nominal GDP	Annual Growth (%)	Inflation (%)	Real Growth (%)	Unemployment Rate (%)
2008	**16080.1**	**---**	**14**	**---**	**12.7**
2009	**17421.9**	**0.08**	**0.7-**	**0.7**	**12.9**
2010	**19265.0**	**0.10**	**4.8**	**6.8**	**12.5**
2011	**20962.1**	**0.08**	**4.2**	**4.2**	**12.9**
2012	**22460.5**	**0.07**	**4.5**	**3.5**	**12.2**
2013	**24462.7**	**0.08**	**4.8**	**4.8**	**12.6**
2014	**26161.8**	**0.06**	**2.9**	**4.9**	**11.9**
2015	**27396.8**	**0.04**	**0.9-**	**4.9**	**13.0**
2016	**28323.7**	**0.03**	**0.8-**	**3.8**	**15.3**
2017	**29400.4**	**0.03**	**3.3**	**0.3-**	**18.5**
2018	**30481.8**	**0.03**	**2.0**	**1**	**18.6**
2019	**31597.1**	**0.03**	**2.5**	**0.5**	18.6
2020	**31025.3**	**0.01-**	**0.03**	**3.5-**	**23.9**
2021	32870.2	**0.05**	**1.4**	**1.35-**	**23**
2022	34623.5	**0.05**	**4.23**	**4.18-**	**23**
2023	36272.8	**0.04**	**2.08**	**2.04-**	**22.0**
2024	37880.1	**0.04**	1.9	**1.86-**	**21.4**

Source: Central Bank of Jordan (Financial Stability Reports and Statistical Bulletins), Department of Statistics (National Accounts), and IMF (Public Sector Debt Statistics), annual series 2008–2024.

Annual growth rates calculated using: $G = (Y_t - Y_0) / Y_0 \times 100$

Whereas:

G: annual growth rate; Y_0: base-year values; Y_t: values in the comparison year.

Real Growth = Nominal Growth – Inflation Rate

From 2008 to 2015, real GDP growth remained positive, averaging around 4.5% which helped maintain unemployment near 12% and supported nominal GDP growth, despite political and security crises in neighboring Iraq, Syria, and Lebanon.

Between 2015 and 2019, however, real growth weakened, registering the lowest levels across the study period mainly due to regional instability, declining global demand, the Syrian refugee influx, and the COVID-19 pandemic. Despite these pressures, the Central Bank of Jordan successfully maintained financial stability through effective policy measures, including exchange rate stabilization and building up foreign currency reserves to $12.9 billion in 2016.

Though nominal GDP continued to grow at approximately 3% annually during 2016–2019, unemployment rose from 15.3% to 18.6%. The economy remained vulnerable to geopolitical tensions, fluctuating oil prices, and structural weaknesses in the labor market, exacerbated by low-wage Syrian labor inflows.

Real GDP in productive sectors (at constant prices) posted modest gains of 3.3%, 4.3%, 4.6%, and 4.2% for the years 2021 to 2024, respectively. The services sector retained a dominant share, accounting for over 65% of GDP. These results demonstrate the resilience of Jordan's policy framework, particularly in supporting manufacturing, tourism, and service activities backed by remittances

2.2. Evolution of Public Debt (2008–2024)

Tracking the dynamics of macroeconomic variables such as GDP, public debt, and gross capital formation offers valuable insights into the trajectory of economic growth, structural development, and the factors driving fluctuations therein. These variables offer policymakers essential insights for designing fiscal, monetary, trade, and exchange rate policies, and for planning strategies that enhance economic performance and resilience to both internal and external shocks.

In the case of Jordan, public debt, especially external debt, has been increasingly used as a financing tool for public expenditure, which constitutes the largest component of aggregate demand. This, in turn, affects both aggregate supply and capital accumulation. However, as Tables (1) and (2) indicate, external public debt grew by approximately 400% between 2008 and 2018, whereas GDP increased by only about 50% during the same period. As a result, the public debt-to-GDP ratio rose from 59% to 94%, a trend that clearly reflects the inefficient allocation of public debt, much of which was absorbed by current expenditures that offer limited value-added, rather than productive capital investments.

Jordan's vulnerability is further exacerbated by its geopolitical positioning in a volatile region and its exposure to oil price shocks, particularly given its reliance on oil-importing rentier states. Although external debt tends to follow a similar trajectory to total public debt, the economic implications differ across domestic and external components due to their distinct structural and financial characteristics.

Table 2: Trends in External Public Debt and Debt Ratios (2008–2024) (in Million Jordanian Dinars)

Year	External Debt	Annual Change (%)	Ext. Debt / GDP	Domestic Debt	Total Debt / GDP
2008	3640.2	---	0.22	5754.8	59.6
2009	3869.0	0.06	0.22	7086.0	64.4
2010	4610.8	0.19	0.23	7980.0	66.9
2011	4486.8	0.02-	0.21	9996.5	70.6
2012	4932.4	0.09	0.21	12000.8	80.2
2013	7234.5	0.46	0.29	12440.8	86.6
2014	8030.1	0.10	0.30	14821.6	88.5
2015	9390.5	0.16	0.34	15488.0	92.4
2016	10299.0	0.09	0.36	15783.0	94.3
2017	11867.2	0.15	0.40	12456.8	94.3
2018	12087.5	0.01	0.39	16220.8	94.4
2019	12338.2	0.02	0.39	17738.0	94.6
2020	14098.3	0.14	0.40	18933.7	94.1
2021	15507.2	0.09	0.47	20259.5	108.8
2022	16911.0	0.09	0.48	21579.2	111.2
2023	18691.8	0.10	0.51	22489.9	113.5
2024	19822.4	0.06	0.52	24339.5	116.6

Source: Central Bank of Jordan, Research & Statistics Department, Annual Reports (various years).

By the end of 2009, public debt had risen sharply to meet the financing needs of the state budget and its annexes for 2010. The Jordanian government pursued alternative financing sources, including issuing international Eurobonds worth $750 million. A significant share up to 92% of total public borrowing, was allocated to cover the fiscal deficit, with domestic banks being the principal financiers in 2010.

By 2018, external debt had climbed to JD 12.1 billion, accounting for 39% of GDP, and the total debt-to-GDP ratio reached 94.4%. This sharp increase was partially driven by rising household indebtedness, which surged from 65.5% of disposable income in 2013 to 69.4% in 2015. These dynamics were largely a response to regional shocks, such as the war on terrorism and oil price collapses, which significantly impacted Jordan's macroeconomic stability.

Jordan's structural weaknesses further compound its vulnerability: it is a small economy with minimal domestic energy resources and persistently high unemployment. The country depends entirely on imported energy and natural gas, with energy imports representing 25–30% of total imports.

Between 2016 and 2019, both external and domestic debt continued to grow. External debt rose from JD 10.3 billion to JD 12.3 billion, while domestic debt increased from JD 15.8 billion to JD 17.7 billion. This suggests that aggregate supply in Jordan was insufficient to meet aggregate demand, thus necessitating higher public borrowing to finance increased spending. However, this reliance on debt to bridge structural gaps exposed the economy to global financial turbulence and undermined policy autonomy, particularly given the rising debt-to-GDP ratio (reaching 94.4%).

The slowdown in industrial sectors, especially mining, further weakened economic resilience. Phosphate production declined by 7.8% in 2018, and potash output slowed from 15.8% in 2017 to 4.9% in 2018 due to falling global demand. Meanwhile, agricultural productivity stagnated, and industrial investment in Amman's stock exchange remained weak.

From 2021 to 2024, both external and domestic debt levels continued to rise significantly. External debt climbed from JD 15.5 billion to JD 19.8 billion, while domestic debt increased from JD 20.3 billion to JD 24.3 billion. The total public debt-to-GDP ratio surged from 108.8% to 116.6% during this period. This reflects the lingering effects of the COVID-19 crisis, persistent fiscal deficits, the ongoing Syrian refugee crisis, and continued regional political instability, all of which placed considerable strain on Jordan's fiscal and economic systems.

2.3. Trends in Capital Expenditure (2008–2024)

Capital expenditure represents a vital component of fixed capital formation in any economy. It facilitates the creation of physical assets, supports infrastructure development, and boosts the rate at which capital is accumulated. Therefore, capital spending is influenced by both economic conditions and the structural aspects of public budgeting. Together with current expenditures—which typically cover operational costs, wages, salaries, and routine administration—it forms the dual structure of government spending. In contrast, capital expenditures are focused on development and investment projects.

In Jordan, capital expenditure stood at JD 958.5 million in 2008, rising to JD 1,444.5 million in 2009 before declining to JD 962.8 million in 2010 and JD 1,057.1 million in 2011. As a share of total government spending, capital expenditure accounted for 17.6%, 24.0%, 16.8%, and 15.6% respectively over these years, with an average share of just 6.05% of GDP between 2008 and 2011. This implies that approximately 93% of public spending during this period was directed toward current expenditures, leaving limited fiscal space for investment in productive infrastructure. Such a composition weakened capital accumulation and reduced the government's ability to sustain debt-financed growth. This imbalance also contributed to a widening fiscal deficit, which reached approximately 4.9% of GDP during this time.

Table 3: Capital Expenditure Trends (2008–2024) (in Million Jordanian Dinars)

Year	Capital Expenditure	Annual Change (%)	CapEx / Total Expenditure (%)	CapEx / GDP (%)
2008	958.5	---	17.6	6.0
2009	1444.5	**50**	24.0	8.1
2010	962.8	**33-**	16.8	4.9
2011	**1057.1**	**9**	**15.6**	**5.2**
2012	**675.9**	**36-**	**9.8**	**3.1**
2013	**1021.0**	**50**	**14.4**	**4.3**
2014	**1137.5**	**11**	**14.5**	**4.5**
2015	**1098.4**	**3-**	**14.2**	**4.1**
2016	**1029.2**	**6-**	**12.9**	**3.8**
2017	1060.1	**3**	**13.0**	**3.7**
2018	947.7	**11-**	**11.1**	**3.2**
2019	915.5	**3-**	11	3
2020	822.8	**10-**	10	3
2021	**1138.2**	**34**	**11.5**	**3.5**
2022	1512.3	**32**	**14.4**	**4.4**
2023	1377.2	**8-**	**12.5**	**3.8**
2024	**1169.6**	**15-**	**10.1**	**3.1**

Source: Central Bank of Jordan, Research & Statistics Department, Annual Reports (various years).

In 2012, capital spending declined sharply by 36% compared to the previous year, largely due to the economic slowdown resulting from regional instability, particularly the Syrian crisis, which disrupted trade corridors with Iraq and Syria and imposed additional fiscal burdens from hosting large numbers of refugees. Despite the resilience shown by some growth-driving sectors, Jordan's economic momentum weakened, and capital expenditure remained relatively flat as a share of total public spending (averaging around 14%) and GDP (around 4.3%) between 2013 and 2015.

Some recovery in fiscal revenue was observed during this period, due to reform policies and improved revenue administration, which helped reduce the fiscal deficit. However, this improvement largely benefited current spending at the expense of capital investment. Given the difficult regional environment and restrictive fiscal and monetary policy stance, prospects for robust GDP growth remained limited in the absence of deeper structural reforms.

Capital spending continued to decline, reaching JD 1.06 billion in 2017 and falling further to JD 822.8 million in 2020, reflecting fiscal rigidities, a rising wage bill, and increasing debt-service costs that crowded out investment outlays during periods of heightened geopolitical stress and pandemic-related pressures. The negative growth in capital expenditure over these years reflects Jordan's fiscal constraints, compounded by the effects of the COVID-19 pandemic, which negatively impacted nearly all macroeconomic indicators.

During the 2022–2024 period, the gap between government revenues and expenditures widened further, despite increases in foreign grants to Jordan, as regional trade disruptions, refugee-related pressures, and higher interest expenditures constrained fiscal space and temporarily reprioritized current spending over productive capital investment. The expansion of the fiscal deficit placed additional pressure on investment spending, which remained consistently lower relative to current expenditure.

To statistically analyze the relationship between the study variables, the model considers external debt (X1), domestic debt (X2), and capital expenditure (X3) as independent variables, with GDP (Y) as the dependent variable, using annual data for 2008–2024 sourced from the Central Bank of Jordan (statistical bulletins, financial stability reports), the Department of Statistics (national accounts), and IMF publications; full unit-root tests, Johansen cointegration outputs, and model specifications are provided in an appendix for reproducibility. Stationarity of the time series was tested using the Augmented Dickey-Fuller (ADF) method. Results (shown in Table 4) indicate that the GDP series became stationary at the second difference with a constant term. The computed ADF t-statistic (-5.742568) exceeds its critical values, allowing us to reject the null hypothesis of a unit root and conclude that the series is stationary.

Table 4: Time Series Stability Test

Null Hypothesis: D(Y,2) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=3)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-5.742568	0.0005
Test critical values:	1% level		-4.004425	
	5% level		-3.098896	
	10% level		-2.690439	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 14				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(Y,3)				
Method: Least Squares				
Date: 07/31/25 Time: 07:53				
Sample (adjusted): 2011 2024				
Included observations: 14 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Y(-1),2)	-1.453551	0.253119	-5.742568	0.0001
C	-6.880930	210.6656	-0.032663	0.9745
R-squared	0.733197	Mean dependent var		-38.80714
Adjusted R-squared	0.710964	S.D. dependent var		1465.650

S.E. of regression	787.9641	Akaike info criterion	16.30835
Sum squared resid	7450649.	Schwarz criterion	16.39964
Log likelihood	-112.1584	Hannan-Quinn criterion.	16.29989
F-statistic	32.97708	Durbin-Watson stat	2.294148
Prob(F-statistic)	0.000093		

Source: Prepared by researchers in EViews (version 2009) using annual data for 2008–2024; complete ADF outputs and lag-selection criteria are documented in Appendix A.

To examine the existence of a long-term relationship between the research variables, we apply the Johansen–Juselius (JJ) cointegration test with a linear deterministic trend and one lag in first differences; detailed trace and max-eigen statistics, eigenvalues, and normalization are reported in Appendix B. For co-integration, following Table 5, we find that there is a common integration between the variables (y, x1, x2, x3) because the calculated Trace Statistic, Max Eigen Value is greater than its tabular value, and therefore it can be said that there is a long-term relationship between the variables and that the changes that occur in the internal and external public debt and capital expenditure in the short term can correct the fluctuations in the total supply in the long run, and this is in line with the logic of economic theory that emphasizes the importance of public spending. In correcting the time course of the output (GDP).

Table 5: Johansen-JSLS Test

Sample (adjusted): 2010 2024				
Included observations: 15 after adjustments				
Trend assumption: Linear deterministic trend				
Series: Y X1 X2 X3				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Self-esteem	Statistic	Critical Value	Prob.**
None *	0.821206	59.50719	47.85613	0.0028
At most 1 *	0.781313	33.68440	29.79707	0.0170
At most 2	0.485258	10.88271	15.49471	0.2188
At most 3	0.059576	0.921366	3.841466	0.3371
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Own	0.05	
No. of CE(s)	Self-esteem	Statistic	Critical Value	Prob.**
None	0.821206	25.82278	27.58434	0.0826
At most 1 *	0.781313	22.80169	21.13162	0.0288
At most 2	0.485258	9.961345	14.26460	0.2145
At most 3	0.059576	0.921366	3.841466	0.3371
The max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):				
And	X1	X2	X3	
0.000482	-0.000799	8.95E-05	0.009093	
6.77E-05	0.000568	-0.000842	0.000826	
0.001230	-0.000589	-0.000880	0.002271	
0.000689	-0.000991	-8.98E-05	0.001974	

Source: Prepared by researchers using EViews 2009.

3. Conclusions and Recommendations

3.1. Conclusions

3.1.1. The Jordanian economy is relatively small and open, relying almost entirely on imported energy and natural gas, which constitutes 25–30% of total imports, making it vulnerable to economic and political shocks.

3.1.2. Public debt (domestic and external) increased steadily from 60% to 116% of GDP during 2008–2024.

3.1.3. Capital expenditure as a share of total government spending remained below 15% on average, favoring current expenditure and weakening capital productivity

3.1.4. Geopolitical conditions in neighbouring countries (Iraq and Syria) negatively impacted Jordan, leading to higher current and investment spending.

3.1.5. Unemployment rates increased significantly over the period, especially in the later years of the study

3.1.6. Econometric analysis (cointegration) confirms a long-term relationship between GDP, public debt, and capital expenditure, indicating that short-term changes in debt and investment can correct aggregate supply fluctuations over the long run

3.2. Recommendations

3.2.1. Increase the productivity of sectors that can substitute imports to reduce vulnerability to external shocks and meet domestic demand.

3.2.2. Restructure public debt and amortize portions to alleviate fiscal pressures.

3.2.3. Limit unproductive current expenditures and prioritize capital investment to strengthen productive capacity.

3.2.4. Policymakers should enhance labor productivity in employment-intensive sectors to generate jobs and reduce unemployment.

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